In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Claims 1-22 (Cancelled)

23. (Currently Amended) A method comprising:

providing an overlay pattern having a plurality of measurement locations, each measurement location includes a bottom diffraction grating and a top diffracting grating that overlies the bottom diffraction grating and has a designed in offset from the bottom diffraction grating, wherein at least two measurement locations in the overlay pattern differ from each other at least partially due to local process variations created during processing of the overlay pattern;

illuminating each of the plurality of measurement locations of the overlay pattern with incident radiation that reacts with the diffraction gratings;

detecting the radiation from the measurement locations after reacting with the diffraction gratings;

determining a measurement of an overlay error between the bottom diffraction gratings and the top diffraction gratings using the detected radiation from the measurement locations from the overlay pattern; and

correcting the determined measurement of the overlay error for effects of the local process variations created during processing of the overlay pattern using the detected radiation from at least one pair of the measurement locations from the overlay pattern.

24. (Currently Amended) The method of Claim 23, further comprising:

providing the overlay pattern having the plurality of measurement locations prior to depositing the top diffraction gratings over the bottom diffraction gratings, such that the overlay pattern is incomplete and each measurement location of the incomplete overlay pattern has a bottom diffraction grating;

illuminating each of the plurality of measurement locations of the incomplete overlay pattern with incident radiation that reacts with the bottom diffraction gratings; and

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detecting the radiation from said plurality of measurement locations of the incomplete overlay pattern;

wherein determining the measurement of the overlay error uses the detected radiation from the measurement locations from the incomplete overlay pattern and the detected radiation from the measurement locations from the overlay pattern;

wherein correcting the determined measurement of the overlay error for effects of the local process variations uses the detected radiation from at least one pair of the measurement locations from the overlay pattern and the detected radiation from the incomplete overlay pattern.

25. (Currently Amended) The method of Claim 24, wherein using the detected radiation from the measurement locations of the incomplete overlay pattern and the detected radiation from the measurement locations of the completed overlay pattern to determine the overlay error comprises:

generating a plurality of ratios of differential spectra from measurement locations of the incomplete overlay pattern;

generating a plurality of differential spectra from measurement locations of the completed overlay pattern;

using said plurality of ratios and said plurality of differential spectra to determine the measurement of the overlay error.

26. (Original) The method of Claim 25 wherein using said plurality of ratios and said plurality of differential spectra comprises directly solving for the overlay error based on said plurality of ratios and said plurality of differential spectra.

27. (Original) The method of Claim 25, wherein using said plurality of ratios and said plurality of differential spectra comprises curve fitting.

28. (Currently Amended) The method of Claim 23, wherein correcting the determined measurement of the overlay error for effects of the local process variations created during processing of the overlay pattern is performed while determining the overlay error.

29. (Currently Amended) The method of Claim 23, wherein:

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the overlay pattern has at least four measurement locations;

at least a first pair of the measurement locations have a designed in offset of a first magnitude and at least a second pair of the measurement locations have a designed in offset of a second magnitude; and

correcting the determined measurement of the overlay error for effects of the local process variations created during processing of the overlay pattern uses the detected radiation from the first pair of measurement locations that have the designed in offset of the first magnitude.

30. (Original) The method of Claim 29, wherein the first pair of measurement locations have a designed in offset of the first magnitude in the same direction and the second pair of measurement locations have a designed in offset of the second magnitude in opposite directions.

31. (Currently Amended) The method of Claim 29, wherein correcting the determined measurement of the overlay error for effects of the local process variations created during processing of the overlay pattern further uses the detected radiation from the second pair of measurement locations that have the designed in offset of the second magnitude.

32. (Original) The method of Claim 31, wherein the first pair of measurement locations have a designed in offset of the first magnitude in opposite directions and the second pair of measurement locations have a designed in offset of the second magnitude in opposite directions.

33. (Currently Amended) A method comprising:

providing an overlay pattern having at least four measurement locations, each measurement location having a bottom diffraction grating and a top diffracting grating that overlies the bottom diffraction grating and has a designed in offset from the bottom diffraction grating, at least two pairs of the measurement locations have the same magnitude designed in offset wherein at least two measurement locations in the overlay pattern differ from each other at least partially due to local process variations created during processing of the overlay pattern;

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illuminating each of the measurement locations of the overlay pattern with incident radiation that reacts with the diffraction gratings;

detecting the radiation from the measurement locations after reacting with the diffraction gratings;

determining a measurement of an overlay error between the bottom diffraction gratings and the top diffraction gratings using the detected radiation from the measurement locations; and

correcting the determined measurement of the overlay error for effects of the local process variations created during processing of the overlay pattern using the detected radiation from at least one pair of the measurement locations from the overlay pattern.

34. (Original) The method of Claim 33, wherein at least two of the measurement locations have the same magnitude designed in offset in opposite directions and at least two measurement locations have the same magnitude designed in offset in the same direction.

35. (Original) The method of Claim 33, wherein a first pair of the measurement locations have a first magnitude designed in offset in opposite directions and a second pair of the measurement locations have a second magnitude designed in offset in opposite directions, wherein the first magnitude is different than the second magnitude.

36. (Currently Amended) The method of Claim 33, wherein correcting the determined measurement of the overlay error for effects of the local process variations created during processing of the overlay pattern is performed while determining the overlay error.

37. (New) The method of Claim 23, wherein the local process variations cause the at least two measurement locations in the overlay pattern to differ from each other with respect to at least one of film thickness, grating height of the bottom diffraction grating and linewidth of the bottom diffraction grating.

38. (New) The method of Claim 24, wherein the incomplete overlay pattern includes the local process variations.

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39. (New) The method of Claim 33, wherein the local process variations cause the at least two measurement locations in the overlay pattern to differ from each other with respect to at least one of film thickness, grating height of the bottom diffraction grating and linewidth of the bottom diffraction grating.

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